

REMARKS/ARGUMENTS:

Claims 29, 31, 32, and 37 are canceled without prejudice. Claims 27, 30, and 38 are amended. Support for the amendment to claim 27 can be found in claims 29 and 37. Claims 27, 28, 30, 33-36, and 38 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claims 27-30, 35, and 36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Aoyama et al. (U.S. Patent Application Publication No. 2003/0024733), Komori (U.S. Patent No. 6,265,242) and Lindmayer (U.S. Patent No. 4,057,439).

Claims 31, 32, 37 and 38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Aoyama, Komori and Lindmayer as applied to claim 29 above and further in view of Okada (JP 2000332272).

The above rejections are moot with respect to claims 29, 31, 32, and 37 due to the cancellation of these claims. The subject matter of claims 29 and 37 are incorporated into claim 27. Applicant respectfully traverses this rejection as to amended claims 27, 28, 30, 35, and 36.

Claim 27, as amended, is as follows:

A solar cell module comprising:
a plurality of solar cell elements each having a front surface and a rear surface;
a first bus bar electrode on the front surface;
a second bus bar electrode on the rear surface;
a plurality of finger electrodes, wherein at least one of the finger electrodes has an end which is connected to at least one of the first and the second bus bar electrodes formed on the front surface and/or the rear surface;

each bus bar electrode having a longitudinal direction;
an inner lead for electrically connecting the first bus bar electrode of a one of the solar cell elements and the second bus bar electrode of an other of the solar cell elements;

and a filler for sealing the first and the second bus bar electrodes, the finger electrodes and the inner lead,

wherein in a plan view of the front surface of the solar cell element, a width of the inner lead along a width direction perpendicular to the longitudinal direction is smaller than one of a width of the first bus bar electrode and a width of the second bus bar electrode along the width direction,

wherein each of the first and the second bus bar electrodes comprises a first region being connected with the inner lead and a second region including an edge portion along an edge parallel to the longitudinal direction that is nearer to the edge than the first region, and

wherein the at least one end of the finger electrode that is connected to at least one of the first and the second bus bar electrodes and the second region is in direct contact with the filler.

Applicant respectfully submits that the differences between the subject matter of claim 27 and the cited art are such that the subject matter as a whole would not have been obvious at the time the invention was made to a person of ordinary skill in the art. Applicant submits that the cited references do not teach or suggest a "solar cell module" according to claim 27 comprising "a plurality of finger electrodes, wherein at least one of the finger electrodes has an end which is connected to at least one of the first and the second bus bar electrodes" and "the at least one end of the finger electrode that is connected to at least one of the first and the second bus bar electrodes and the second region is in direct contact with the filler." Nor has the Office cited any other rationale or provided any other reasoned explanation on which an obviousness rejection may be made.

It is an aspect of the present invention that the solar cell comprises a plurality of finger electrodes and at least one end the finger electrode is connected to the bus bar electrode. If the solar cell is brought into direct contact with the filler

over the whole length such that the finger electrode and the inner lead are not connected to each other with the solder, stress concentrations between the finger electrode and the surface of the substrate can be restrained, thereby making it possible to prevent defects such as micro cracks from occurring in the substrate. (Applicant's specification, at p. 9, line 22-p. 10, line 7).

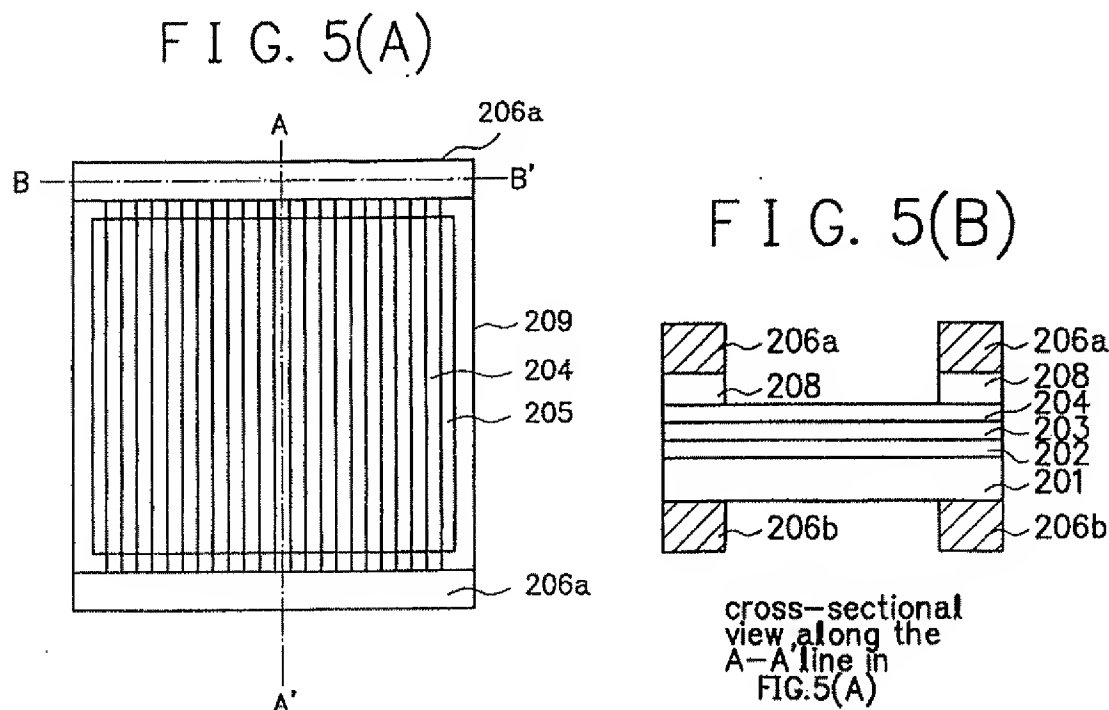
The Office Action at p. 4, lines 16-17 states,

"Regarding claim 29, modified Aoyama teaches a plurality of finger electrodes (205) connected to the bus bar on the light receiving surface (Komori: figures 5A-8)."

And the Office Action at p. 6, lines 3-6 states,

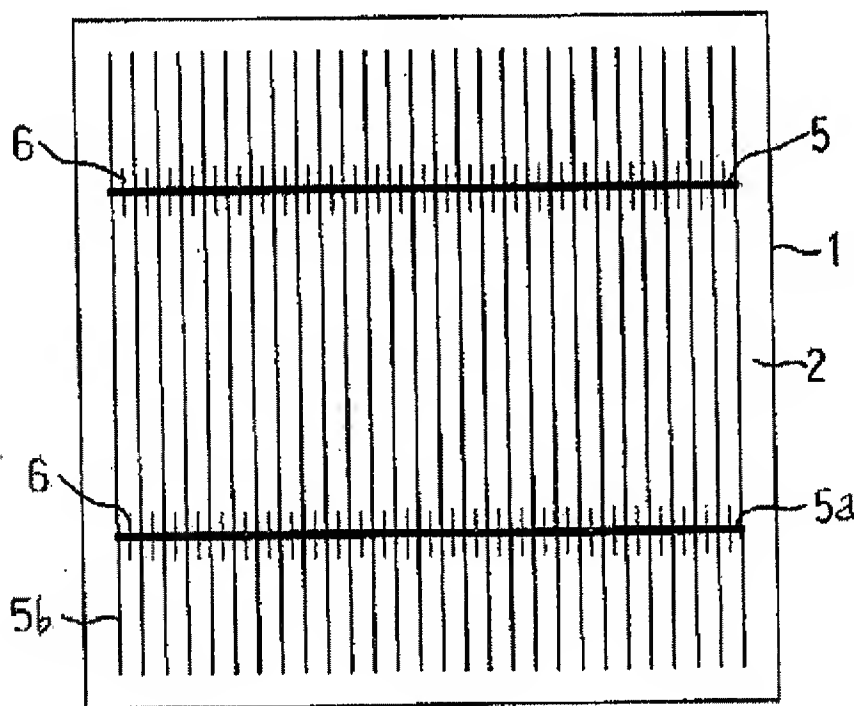
"Modified Aoyama is specifically silent to the finger electrode ends being in direct contact with the filler. Okada teaches using a solder resist to prevent solder bridges between the finger electrodes (abstract)."

Applicant respectfully disagrees. Figs. 5A and 5B of Komori are as follows:



The Office apparently believes that a modified Aoyama teaches a plurality of finger electrodes (205) connected to the bus bar on the light receiving surface (Komori; Figs. 5A -5B). Komori discloses a finger electrodes (205) connected to the bus bar electrode (206). However, neither Aoyama nor Komori teach or suggest that "the at least one end of the finger electrode that is connected to at least one of the first and the second bus bar electrodes and the second region is in direct contact with the filler."

Fig. 2 of Okada is as follows:



Okada teaches solder resists (6) that are positioned between the finger electrodes (5b). The solder resists (6) are provided to restrict the solder bridge from being formed between electrodes. Okada uses the solder resists (6) because the bus bar and finger electrodes (5a, 5b) are coated with solder on their surfaces. This type of solder coating is inherently required in Okada's solar cell.

In contrast, in claim 27, as amended, at least one ends of the finger electrodes and the second region are not coated with solder and are therefore, directly in contact with the filler.

Lindmayer cannot remedy the defect of Aoyama, Komori, and Okada and is not relied upon by the Office for such. Instead, the Office cites Lindmayer for teaching encapsulating serially connected solar cells for their protection from ambient conditions.

In light of the foregoing, Applicant respectfully submits that the cited references cannot render claim 27 obvious, because the cited references fail to teach or suggest each and every claim limitation. Claims 28, 30, 35, and 36 depend from claim 27 and therefore, cannot be rendered obvious over the cited references for at least the same reasons as claim 27. Withdrawal of these rejections is thus respectfully requested.

Claim 33 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Aoyama, Komori and Lindmayer as applied to claim 27 above and further in view of Tanaka (U.S. Patent Application Publication No. 2002/0148499). Applicant respectfully traverses this rejection.

Claim 33 depends from claim 27 and is therefore, patentable over Aoyama, Komori, Lindmayer, and Okada for at least the same reasons discussed above. Tanaka cannot remedy the defect of Aoyama, Komori, Lindmayer, and Okada and is not relied upon by the Office for such. Instead, the Office cites Tanaka for teaching a solar cell string which uses a lead free bismuth containing solder because lead is harmful.

In light of the foregoing, Applicant respectfully submits that the cited references cannot render claim 33 obvious, because the cited references fail to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

Claim 34 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Aoyama, Komori and Lindmayer as applied to claim 27 above and further in view of Lally (U.S. Patent No. 6,198,207) and Kujas (U.S. Patent No. 4,685,604). Applicant respectfully traverses this rejection.

Claim 34 depends from claim 27 and is therefore, patentable over Aoyama, Komori, Lindmayer, and Okada for at least the same reasons discussed above. Lally and Kujas cannot remedy the defect of Aoyama, Komori, Lindmayer, and Okada and are not relied

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upon by the Office for such. Instead, the Office cites Lally for teaching a solder composition for an electronic device which has Sn and a shrinkage coefficient of 0.3% which reduces the residual stresses after solidification of the solder; and Kujas for teaching that severe expansion and contraction of solder joints promote stress and failure.

In light of the foregoing, Applicant respectfully submits that the cited references cannot render claim 34 obvious, because the cited references fail to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

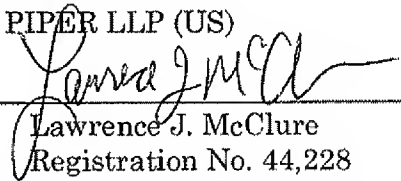
If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 595-3107 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 07-1896.

Respectfully submitted,

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